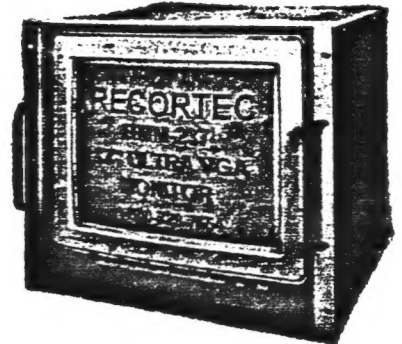
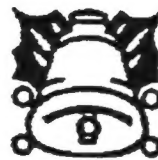


# LISTing Newsletter

Newsletter of the Long Island  
Sinclair/Timex Users Group

Next Meeting  
Dec 11 1994

New Meeting Location - See Page-2-



## RGB Monitor Connections

### *Listing Policy*

*Annual Dues \$16.00*

One "sample" copy sent upon receipt of Business size SASE.  
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We are always looking for articles, programs, reviews etc. to keep our members informed and entertained. You maintain full credit and copyright.

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\*\*\*\*\*  
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 LIBR. TOM SKAPINSKI  
 \*\*\*\*\*

PLEASE SEND INQUIRIES TO:  
 LIST  
 MR. HARVEY RAIT  
 5 PERI LANE  
 VALLEY STREAM, N.Y. 11581

PLEASE SEND SUBMISSIONS TO:  
 LISTING  
 MR. FREDERIC STERN  
 P.O. BOX 264  
 HOLBROOK, N.Y. 11741  
 \*\*\*\*\*

COMING EVENTS:  
 \*\*\*\*\*

DEC. 11, 1994 LIST MEETING.

\*\*\*\*\*  
 \*\*SPECIAL NOTICE\*\*  
 \*\*\*\*\*

THE NEXT MEETING WILL BE HELD AT  
 HARVEYS HOME;  
 5 PERI LANE  
 VALLEY STREAM, N.Y.

MEETING MINUTES  
 \*\*\*\*\*  
 REPORTED BY: FRED STERN.  
 NOV. 13, 1994

\*\*\*\*\*  
 THE MEETING WAS CALLED TO ORDER  
 BY HARVEY AT 2:00PM

IN THE MAIL WE RECEIVED, NEWS-  
 LETTER EXCHANGES AND 1 RENEWAL.

THIS WAS OUR LAST LIST MEETING  
 AT THE ICE CREAM DISPENSARY.  
 HARVEY HAS DECIDED TO RETIRE  
 FROM THE BUSINESS. NOW, PERHAPS  
 HE CAN GET MORE INVOLVED WITH  
 HIS TIMEX COMPUTER.

MEMBERSHIP DUES ARE DO IN  
 JANUARY FOR MANY OF US. PLEASE  
 DO NOT FORGET TO SEND THEM IN.

WE WERE SAD TO READ THAT THE  
 DECEMBER ISSUE WILL BE THE LAST  
 FOR THE PLOTTER.

WE ALSO HEARD THAT AERCO HAS  
 SOLD ITS REMAINING TIMEX PERI-  
 PHERALS TO RMG ENTERPRISES.

WE THEN HELD A GENERAL ROUND-  
 TABLE DISCUSSION ON VARIOUS  
 TOPICS.



# CLASSIFIEDS

\*\*\*\*\*  
 THIS CLASSIFIED SECTION IS  
 AVAILABLE TO ALL LIST MEMBERS  
 FREE OF CHARGE.  
 THE ONLY RESTRICTION IS THAT  
 IT IS TO BE USED ONLY FOR THE  
 SEEKING, SELLING OR SWAPPING  
 OF SINCLAIR, TIMEX OR MICROACE  
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 DO NOT ENDORSE, WARRANTY, OR  
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\*\*\*\*\*  
 THE FOLLOWING PUBLICATIONS ARE  
 AVAILABLE ONLY THROUGH LIST:

ZX-81/TS1000 TECHNICAL TIDBITS  
 TECHNICAL TIDBITS PART II  
 SAVINGS AND LOAD OF THE TIMEX  
 COMPUTER  
 \$4.00 EACH.

FOR SALE: TIMEX PRINTER PAPER,  
 3 ROLLS - \$5.00+ POSTAGE.  
 CONTACT: FRED STERN 516-737-0963  
 EVENINGS AND WEEKENDS.

## A FINAL WORD

\*\*\*\*\*  
 MY NAME IS FRED STERN AND I AM  
 THE EDITOR OF THIS EDITION OF  
 LISTING.

THIS ISSUE HAS BEEN HELL TO GET  
 OUT. I AM SITTING ON THE FLOOR  
 OF MY SONS BEDROOM, WITH MY  
 TS1000 SYSTEM SPREAD ACROSS IT.

I WOULD LIKE TO EXTEND A SPECIAL  
 THANK YOU TO BOB GILDER FOR  
 TYPEING MY MEETING MINUTED LAST  
 MONTH AND FOR THE GREAT JOB HE  
 IS DOING AS PUBLISHER.

I WOULD ALSO LIKE TO EXTEND BEST  
 WISHS TO ALL OUR READERS ON  
 BEHALF OF THE OFFICERS OF LIST  
 FOR A HAPPY AND SAFE HOLIDAY  
 SEASON.

A VERY SPECIAL THANK YOU TO  
 HARVEY FOR HIS HOSPITALITY, AND  
 THE USE OF HIS STORE FOR OUR  
 MEETING. ALSO TO MIKEY FOR HIS  
 CONTRIBUTIONS.

SEE YOU ALL AT THE NEXT MEETING.

| DECEMBER 1994     |    |    |    |    |    |    |
|-------------------|----|----|----|----|----|----|
| SU                | MO | TU | WE | TH | FR | SA |
|                   |    |    |    | 1  | 2  | 3  |
| 4                 | 5  | 6  | 7  | 8  | 9  | 10 |
| 11                | 12 | 13 | 14 | 15 | 16 | 17 |
| 18                | 19 | 20 | 21 | 22 | 23 | 24 |
| 25                | 26 | 27 | 28 | 29 | 30 | 31 |
| LIST MEETING 11TH |    |    |    |    |    |    |

## QL CORNER

According to Bob Dyl of IQLR, there will be another QL show next June, 1995 in Oak Ridge, Tennessee. Quite a few QL vendors from the UK have stated that they will attend - Miracle Systems, TF Services and Dilwyn Jones. Mechanical Infinity and others from the US will also attend. As new information about the up coming show surfaces, it will be reported in the QL Corner.

Last month I purchased some PD software from IQLR at \$2.50 per disk. Two of the programs were outstanding; DKUTIL, a disk utility and the Ergon Demo disk. Both disks are ZIPPed and must be UNZIPPed onto disk for use.

The operating manual for the Disk Utility, five pages, is in \_doc format; easy to read and understand. If you intend to use this utility, print it out so that you can use this utility effectively.

When the Disk Utility program has booted and the DKUTIL\_task has then EW'd into memory a disclaimer appears, pressing ENTER provides a utilities menu: Check disk, Clone Disk, Defragment, Interleave and Map display. Flp1 and Flp2 are default drives. However, you can select between either drives for any of the program disk utilities.

The Check Disk portion checks each sector of a disk to insure that there are no bad sectors on the disk. Clone Disk is a sector copier and while it copies data from one disk to the other disk, it Checks the sectors on the disk; Reads the data from the original disk and Writes data to the target disk. As your disk is being cloned you will see the Checking as a graphic character in six boxes. After the sector check, six R's will be displayed on the same location and then six W's will appear as the data is written on the target disk. The whole process takes 2 minutes and twenty seconds.

I had some old diskettes with data on them. Instead of formatting the disks, the Clone Disk utility had over written them with the new data. This process provides the QL user with a rapid method of cloning diskettes without formatting them again.

The Defragment section is a joy to behold. As I spend most of my time writing text, I save data approximately every 20 minutes on a disk which has other data on it, so the disk becomes fragmented. When Defragmented is selected from the menu, you are asked for the drive number, either flp1\_ or flp2\_. After selecting the drive and pressing ENTER, a statement is issued indicating 'X' amount of files in the root directory and 'X' files in sub directories. The right-hand section of the monitor screen now displays a visual picture of the defragmentation map. You can then replace the disk previously defragmented and place another disk in the drive and defragment it or as many disks as you want.

The remaining two functions are Interleave and Map display. Before a disk is defragmented, you should look at the disk map display. If there are empty sections between data blocks then the disk should be defragmented. No data will be lost during the Defragmentation process.

The Interleave function indicates the current interleave, such as:

Current, SGC (1:1), GC (2:2), QL (3:3) and the current interleave of the disk in your drive.

This PD Disk Utility program is a steal at \$2.50.

The Ergon Demo disk contains an assortment of programs: UNZIP, MBS, QLM, OWR, DEA, C68 Patches and FDU. FDU was the first program I UNZIPped and I wasn't disappointed with it's performance. Some functions for this utility were not available on the PD disk, such as making multiple disk copies and the Collector section for the Disk Editor. However, this utility is excellent as is!

A manual is provided on the disk and has plenty of useful information, including a Tutorial for all of the program functions. Print it out so that you can get the most from this program.

The program loads with a boot file and when in memory displays a menu with ten functions. One item is illuminated with a bar and the user can move the bar with the cursor keys or pressing a letter or number for a desired function. Almost every function on the main menu has another sub menu for additional functions.

The Disk Editor is one of the most useful functions within this program. Pressing '0' on the keyboard activates the reading of the first sector on the source disk. I decided that I would like to try an experiment with the format of a QL disk and change the format to a DOS disk. The QL header will have 'QL5A' written on the disk. Following the previous four characters will either provide ten blank spaces or perhaps a disk name.

Pressing F5 allows editing on the program on the disk. Pressing the 'TAB' key allows the cursor to float to the right hand side of the display where the ASCII characters are stored. I erased the QL5A characters and entered: .4.TAN .3.3: (note that there are two spaces between TAN and .3.3. . Then pressing F3 selects another menu for additional functions within the Disk Editor. Either entering '4' or CTRL/W overwrites the current sector on the disk.

Then I ESCAPed out of the editing mode and closed the file with ESCAPE and into the main menu. I then selected the Disk Copy/Verify menu and then selected a single disk copy with disk verification. The source disk was a DOS program disk. The disk copy option was now selected. While the copying process was going on, there was a visual indication of reading and writing to each sector of the source disk and then the target disk.

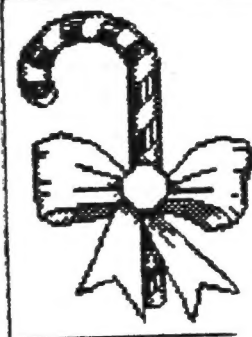
At the completion of the disk copying, I exited the program and then loaded in Conqueror, the IBM emulator. Once in the IBM mode I placed the copy of the DOS program in the A> drive and attempted to run the program on the disk. It worked flawlessly. This was an experiment that worked, however, any QL user who uses Conqueror has access to 'XOVER' which will change a QL disk to a DOS disk.

I was so impressed with this software package that I phoned Frank Davis of Mechanical Affinity and ordered the full blown FDU program at \$25.00. Frank advised me that Mechanical Affinity now carries almost every major software and hardware products produced from Europe and the USA. Cost of any item includes postage and packing - no hidden costs and his firm is only a telephone call away.

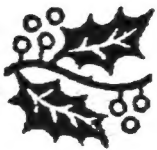
Contact either Carol or Frank Davis, Mechanical Affinity, 513 East Main Street, Peru, Indiana 46970. Telephone 317-473-8031 evenings and weekends.

Have a very Merry Christmas and a healthy and HAPPY NEW YEAR ....

See you next year.....Bob Gilder







# Adding RGB to Your 2068

*Crisp, Beautiful Color Economically*

RGB on the 2068 is probably one of the most gratifying additions you can get. The problem is that there is no simple way to do it and few companies (if any) have any to sell. E. Arthur Brown at 1702 Oak Knoll Dr, Alexandria, MN 56308 did have one they were selling for \$19.95 which installed inside the machine, stripped the sync from the video, and provided for RGB connections. The Timex Technical Manual also shows a way to add RGB by building a three transistor circuit to strip sync from the video for RGB operation.

The problem with stripping the sync from the video is that you don't always get a clean sync signal. Some of the video gets into the sync and causes tearing of the video. Performance also changes if you have something plugged into the video out jack of the computer, loading down the circuit.

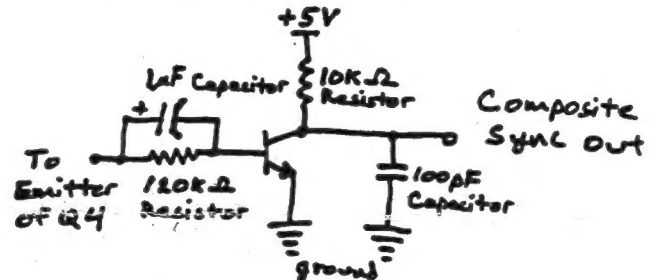
The best way is to get the sync at the source before any video is added - like the TC 2068 does (or did?). Inverted low level sync can be found on the emitter of transistor Q4 in the video circuit. All that is needed is to invert and amplify the sync to a peak to peak voltage of 5 volts which can be accomplished by a simple one transistor circuit.

**WARNING:** You must be very careful while going inside your computer to do any type of work to it. Be sure and disconnect the power before going inside. This is not recommended for a first time project.

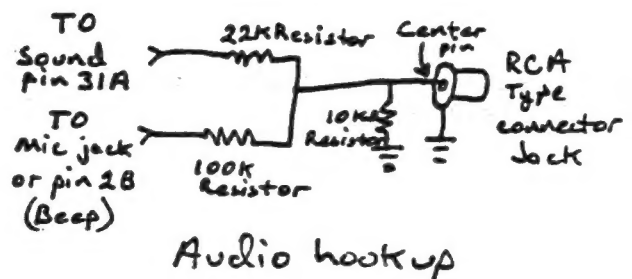
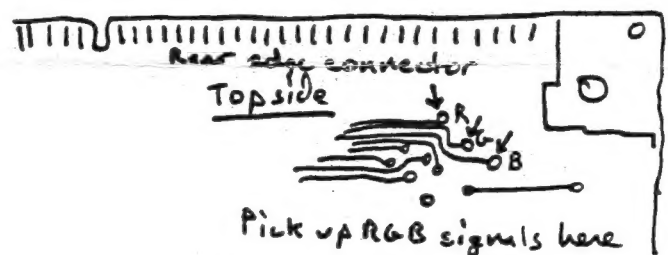
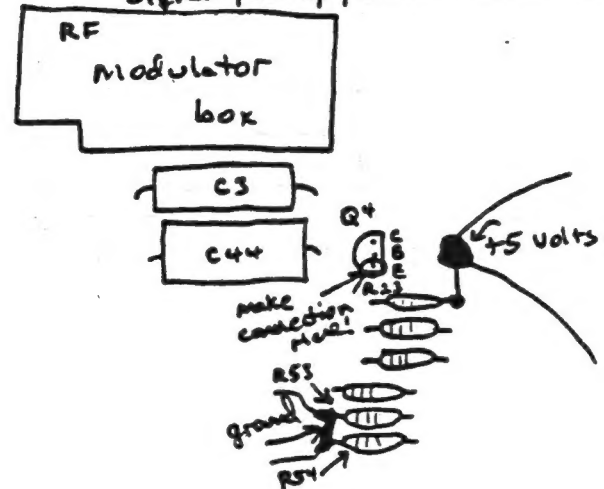
This circuit will provide the type of sync that most RGB monitors require such as the Sears 14 inch RGB monitor, the Magnavox (NAP) model 40 and model 80 RGB monitors, or any monitor that accepts negative-going composite (or horizontal) sync.

The RGB signals are available on the rear edge connector at B27, B28, & B29, and ground at B32. For internal connections, see diagrams. Because the circuit is so simple, they can be mounted freestyle on the printed circuit board. Just take care that they stay close to the board to prevent accidental shorting against the top cover or other components.

## Simple RGB Circuit



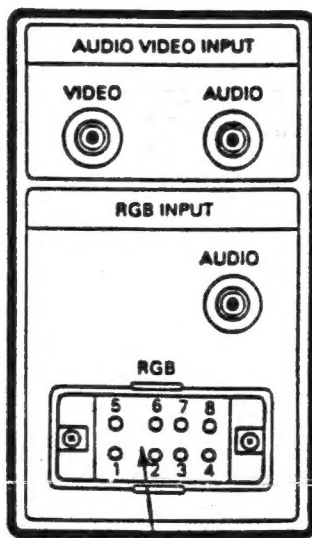
## Signal pickup points inside 2068



To keep this compatible with other Sinclair computers such as the QL and the Spectrum 128 which both have built-in RGB interfaces, an eight-pin "DIN" plug and socket should be used with connections as shown. The eight-pin "DIN" socket can be easily mounted on the rear plastic casing by notching the top and bottom case with wire clippers till the cases will fit back together with the connector between the two.

Shown are three cables, one for the Sears RGB/TV monitor combo, one for the Magnavox, and one for using the QL with a monochrome monitor. All the plugs and sockets should be numbered. Follow the diagram and wire the ends of the cable so that they match up to each other. On the Magnavox cable, you need to mark the ends so that they are not reversed (both ends will have an eight-pin "DIN" plug on it).

An audio jack can also be mounted and connected as shown in the diagram for SOUND and BEEP to be heard through the monitor's audio amp if available.



### Sears RGB Cable

| 8 pin DIN | signal     | Sears Connector |
|-----------|------------|-----------------|
| 2         | Ground     | 5+6             |
| 4         | Comp. Sync | 7               |
| 6         | G          | 3               |
| 7         | R          | 2               |
| 8         | B          | 4               |

### PIN ASSIGNMENTS

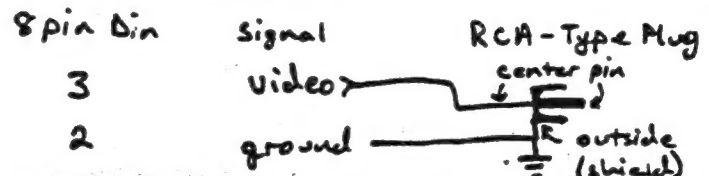
| PIN NO. | TTL INPUT<br>8 PIN<br>SIGNAL |
|---------|------------------------------|
| 1       | IBM Open/Apple Gnd.          |
| 2       | Red                          |
| 3       | Green                        |
| 4       | Blue                         |
| 5       | Intensity                    |
| 6       | Ground                       |
| 7       | Horiz. Sync                  |
| 8       | Vert. Sync                   |



### Magnavox RGB Cable

| 8 pin DIN<br>Computer | Signal     | 8 pin DIN<br>Monitor |
|-----------------------|------------|----------------------|
| 2                     | Ground     | 6                    |
| 4                     | Comp. Sync | 7                    |
| 7                     | R          | 2                    |
| 6                     | G          | 3                    |
| 8                     | B          | 4                    |

### QL Monochrome Monitor Connection



Keep all leads as short as possible, use a shielded cable to the monitor - particularly if you make it very long. Once you have everything hooked up, turn on the computer. It should come up with a white screen and no rolling. Try BORDER with all the colors to make sure they are wired in the right order. If you got everything right, you can now enter the new world of sharp, brilliant displays, and less eye strain!

We had quite a few inquiries as to where to purchase the Magnavox (NAP) RGB Monitors as mentioned in the December issue. They can be found at Service Merchandise which is a chain of catalog showrooms throughout the US. For the

location of the one nearest you or to order a monitor over the phone, dial toll-free 1-800-726-4636. We have also learned that Best Products Co. Inc. also carries them at 1-800-221-BEST. They both have had the model 40 on sale for \$199.95.

Service Merchandise also now has a higher resolution RGB monitor called the Magnavox RGB 80 for \$277. The Magnavox 40 works quite well with the 2068 with OS-64 though. They also have a nice Amber monitor for \$99 which also works well with OS-64.

-- Joe Williamson

| pin | function | signal                     |
|-----|----------|----------------------------|
| 1   | PAL      | composite PAL              |
| 2   | GND      | ground                     |
| 3   | VIDEO    | composite monochrome video |
| 4   | CSYNC    | composite sync             |
| 5   | VSNC     | vertical sync              |
| 6   | GREEN    | green                      |
| 7   | RED      | red                        |
| 8   | BLUE     | blue                       |

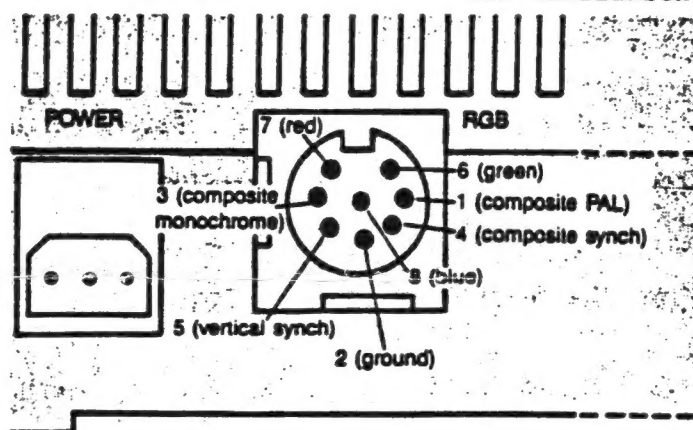


Diagram of Monitor Connector as Viewed from rear of QL. Showing pin numbers and functions.

## Creating Additional Colors on the 2068

If you have ever felt limited on the 2068 with only eight colors, here is a way to create up to fifteen NEW colors and twelve new shades of the ones you already have. Whats the catch? Well, actually there are two. One, you are limited to the new color being the size of the 8 x 8 character grid. Two you have to be using an RGB monitor.

We are not actually creating a new color, we are only making our eyes think they are seeing new color. The first thing we must do is to re-create the graphic character they forgot to bring up from the TS 1000. Remember the gray (first clue) "hash" mark they had? In the 8 x 8 grid, the pixels alternated white and black. With their close proximity, the character as a whole appeared to be gray. With this character on the 2068, if we make the INK yellow and the PAPER red, we get orange.

We need an RGB monitor to see this because of its increased resolution over composite monitors. You can try this on a composite monitor, but most likely you will only get squiggly color lines over this character.

To generate the character, you need to define a graphic character as shown in chapter 18 in the 2068 manual. Use BIN 10101010 = 170 decimal and BIN 01010101

= 85 decimal alternately. Enter the program as shown using the GRAPHICS A where you see the "hash" mark. You can try only making this half of a character to create higher res. graphics of your own.

The new colors can really brighten up your displays and give a new dimension of color possibilities on the 2068. For those who built the RGB interface shown last month now have the opportunity to really see the difference between their old composite screen and an RGB one!

Joe Williamson

```

10 FOR n=0 TO 7: READ a: POKE
USR "a"+n,a: NEXT n
20 DATA 170,85,170,85,170,85,1
70,85
30 FOR n=1 TO 10
40 PRINT PAPER 1: INK 1: " "
NK 2: " " INK 3: " " INK 4: " "
" INK 5: " " INK 6: " "
50 PRINT PAPER 2: INK 2: " "
INK 3: " " INK 4: " " INK 5: " "
" INK 6: " "
60 PRINT PAPER 4: INK 4: " "
INK 5: " " INK 6: " "
70 PRINT PAPER 5: INK 5: " "
INK 6: " "
80 PRINT PAPER 6: INK 6: " "
90 NEXT n
95 PRINT
100 FOR n=1 TO 10
110 FOR m=1 TO 5
120 PRINT PAPER 0: INK m: " "
APER m: " " PAPER 7: " "
125 NEXT m
130 PRINT
140 NEXT n

```



## QL To IBM RGB Monitor Connections

In the past few weeks I have had three requests for information on how to hook-up an IBM CGA or RGB Monitor to a QL. The following information will allow anyone with soldering experience to make an appropriate cable between the QL and an RGB monitor.

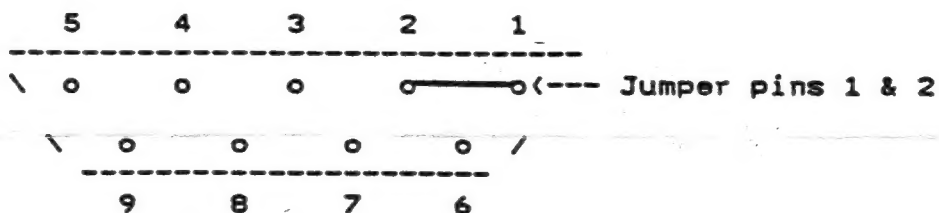
The only problem you may encounter is with the horizontal sync inversion from a negative going sync signal from the QL to a positive going horizontal signal required for most, if not all, American CGA/RGB monitors.

In the following diagrams, I use a 74LS00 TTL IC (Quad 2-input positive-nand gate), of which we will use pins 1 and 2, tied together to form an inverter input. The signal from the QL, which is negative, enters the input of the inverter, pins 1 & 2. The sync signal is now inverted within the IC and a positive horizontal sync signal is available at pin 3 which is connected to the horizontal pin on the monitor connector.

If you happen to have a 74LS04 Hex inverter IC, it also can be used - just use pin 1 as the horizontal input from the QL and pin 2 will be the inverted sync signal output connected to the monitor connector.

All parts for this project can be purchased at any Radio Shack store. In addition to purchasing the two connectors and IC, you will need a 9 pin 'D' connector hood, which if you are careful, can house the IC - just carefully clip all unused pins on the IC and bend pins 1, 2, 3, 7, & 14 in towards the center of the IC. Solder the wires with minimum solder and install the IC upside down (pins facing up) and the two piece connector hood will house it, allowing a clean appearing installation. You will also need a length of cable determined by your requirement. The cable need only be 7 conductors, or if you wish, use 7 - single lengths of multi-stranded wire to form your cable.

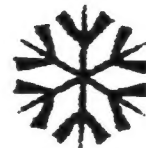
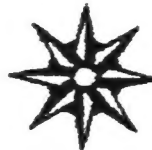
### Male 9 Pin 'D' plug (solder pin side)



### Connections to the male 9 pin 'D' connector

#### Pin #'s

- 1 Ground (common)
- 2 Ground (common)
- 3 Red (RGB signal)
- 4 Green (RGB signal)
- 5 Blue (RGB signal)
- 6 N/C (no connection)
- 7 N/C (no connection)
- 8 Horizontal Sync (negative signal - must be inverted)
- 9 Vertical Sync (Most monitors do not require Neg. sync)





Use pin #7, IC-1 as common  
 Ground points for both cable connectors -  
 (9 pin 'D' pin # 1 & 2)  
 (8 pin 'Din pin # 2).

Horiz Sync out to 9 pin 'D' connector, pin #8.  
 Horiz Sync input from ->2

QL connector (pin #4)  
 (Pins 1 & 2 are jumped together to form an inverted signal input).

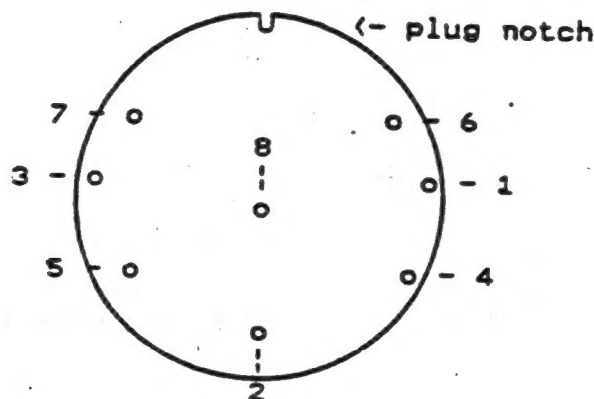
IC-1 will only have 5 pins used, #'s 1, 2, 3, 7, and 14.

|   |   |   |    |
|---|---|---|----|
| o | 7 | o | 8  |
| o | 4 | o | 9  |
| o | L | o | 10 |
| o | S | o | 11 |
| o | 0 | o | 12 |
| o | 0 | o | 13 |
| o | 0 | o | 14 |

14<- +5 volts from QL connector (Pin #1).

74LS00 TTL IC wired as an inverter - IC-1  
 Bottom side up (pins up)

QL



LIST

8 Pin DIN connector(solder pin side)

Connections to the male Din 8 pin connector

Pin #'s

- 1 + 5 volts DC
- 2 Ground (common)
- 3 Composite Signal (not used for RGB)
- 4 Horizontal Sync (negative sync - must be inverted)
- 5 Vertical Sync (Most monitors do not require Neg. sync)
- 6 Green (RGB signal)
- 7 Red (RGB signal)
- 8 Blue (RGB signal)

Cable Connector hookup

Pin #1, 8 pin Din connector to pin #14, IC-1 (+ 5 Volts DC)

Pin #2, 8 pin 'Din connector to pin #7, IC-1 (Common Ground)

Pin #3, 8 pin Din connector NOT USED!

Pin #4, 8 pin Din connector to pin #'s 1 & 2, IC-1 (Horizontal sync input)

Pin #5, 8 pin Din connector to pin #9, 9 pin 'D' connector (Vertical Sync)  
 Pin #6, 8 pin Din connector to pin #4, 9 pin 'D' connector (Green RGB signal)  
 Pin #7, 8 pin Din connector to pin #3, 9 pin 'D' connector (Red RGB signal)  
 Pin #8, 8 pin Din connector to pin #5, 9 pin 'D' connector (Blue RGB signal)

-----

Pin #1 and #2, 9 pin 'D' connector to pin #7, IC-1 (Common Ground)  
 Pin #3, 9 pin 'D' connector to pin #7, 8 pin Din connector (Red RGB signal)  
 Pin #4, 9 pin 'D' connector to pin #6, 8 pin Din connector (Green RGB signal)  
 Pin #5, 9 pin 'D' connector to pin #8, 8 pin Din connector (Blue RGB signal)  
 Pin #6 & #7, 9 pin 'D' connector NO CONNECTION  
 Pin #8, 9 pin 'D' connector to pin #3, IC-1 (Positive Horizontal sync output)  
 Pin #9, 9 pin 'D' connector to pin #5, 8 pin Din connector if required (Vertical sync)  
 Pin #'s 1 & 2, IC-1 to pin #4, 9 pin 'D' connector (Negative Horizontal sync)  
 Pin #3, IC-1, to pin #8, pin 'D' connector (Positive Horizontal sync out)  
 Pin #7, IC-1 (two wires), to pin #'s 1 & 2, 9 pin 'D' connector and to pin #2, 8 pin Din connector  
 Pin #14, IC-1, to pin #1, 8 pin Din connector (Pin #1 is labeled PAL in the QL manual, however, the US QL's have a 5 volt DC connection at this pin).

#### List of parts: Radio Shack part numbers indicated

|          |                                    |                 |
|----------|------------------------------------|-----------------|
| 274-026  | 8 pin male DIN plug                | \$1.79          |
| 276-1537 | 9 pin male 'D' plug                | \$0.99          |
| 276-1539 | 9 pos 'D' Hood                     | \$0.79          |
| 276-1801 | 7400 Quad 2-input NAND gate        | \$0.89          |
| 276-1802 | 7404 Hex inverter                  | \$0.99 *        |
| 278-775  | 9 conductor, double shielded cable | \$0.59 per foot |



\* Use the 7404 Hex inverter as an alternate IC.

#### Additional Information:

An RGB monitor will display 8 primary colors; black, red, yellow, cyan, green, blue, magenta and white. If you purchase a CGA monitor, yellow will appear brown and white will be tinted blue or dirty looking. This is set-up in the G2's (grids of the picture tube) to produce these differences in color because; CGA monitors have one additional line called Intensity. CGA will provide 16 colors if the intensity line is used - IBM only! Yellow will be yellow when intensified and white will be white. You may also find that when you power-up the QL, the tweed memory check display and the F1 - F2 display will roll until you press either function key; then it will stabilize. Try not using the vertical sync line, it may eliminate this problem.

NOTE: If you require any assistance, contact me through LIST.

Bob Gilder.....